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Factors Affecting Engagement and Commercialization of Innovation Activities of Firms in Tanzania

Policy brief DFID/Tilburg University research: *‘Enabling Innovation and Productivity Growth in Low Income Countries’ (EIP-LIC)*.

<http://www.tilburguniversity.edu/dfid-innovation-and-growth/>

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Introduction

In today’s academic and policy debates on growth and development in Low Income Countries (LICs), the importance of innovation raising productivity in the private sector, and within manufacturing Small and Medium Sized Enterprises in particular, has been increasingly emphasized. Innovation is crucial in LICs, because innovation in all economic sectors is fundamental for growth, in order to catch up with middle and high income economies.

Innovation usually involves generation, exploitation and manipulation of new forms of knowledge in creation of new products or services with an enterprise. As innovation entails translation of ideas or inventions into products with economic value the market demands, it is incomplete until innovative products resulting from innovation are accepted and adapted by the market. Such conversion is termed commercialization of innovation, which significantly impacts the economy by enhancing market penetration, dominance and exploitation of new markets by firms that promotes economic performance and leads to growth. It should however be noted that although there are many new ideas and inventions, not all are commercialized in terms of successful market introduction.

Given the significance of commercialization and the low success rate of commercialization, as signaled in academic literature, a more complete understanding of factors driving successful commercialization is necessary. Previous studies have explored a variety of antecedents of technology commercialization such as resources, capabilities, networks, entrepreneurial culture and entrepreneurial activities. Nevertheless, the economic theory still lacks a comprehensive perspective on successful commercialization, especially in LICs.

In the framework of a DFID-funded research project entitled *‘Enabling Innovation and Productivity Growth in Low Income Countries (EIP-LIC)’*, a team of researchers from the University of Dar es Salaam in Tanzania and Radboud University Nijmegen analysed factors determining the commercialization of product innovations in Tanzania. Specifically, the research focused on the relative importance of firm, innovation, and environmental level factors for commercialization and how innovation is linked with commercialization. The original working paper¹ is entitled *‘Factors affecting engagement and commercialization in innovation – Activities of firms in*

¹ The paper is accessible at the project’s website (<http://www.tilburguniversity.edu/dfid-innovation-and-growth/>) under ‘publications and reports’.

Tanzania' (2015) by Otieno Osoro, Stephen Kirama, Joris Knobens and Patrick Vermeulen. This policy brief provides the research approach, main outcomes and policy implications of the paper.

Research approach

Literature on undertaking product innovation and commercialization indicate existence of a variety of factors that impact commercialization in different directions and magnitude. The team of researchers have analysed the following groups of factors.

1. Firm-level factors referring to the availability of complementary assets with an enterprise such as the existing internal knowledge base, knowledge acquisition, and corporate culture. This also concerns the firm structure and ownership and external networks that facilitate firm to access to critical resources, knowledge and capabilities. Furthermore, the previous experience of managers in bringing innovations to market which also impact firm decisions on innovation. Firm-level factors enable to absorb scientific or technological information and enhance commercialization of innovations with higher likelihood of being consistent with market demand.
2. Innovation-level factors pertaining to the alignment of that innovation to a firm's business model, nature of firm's product, communication costs, and absorptive capacity. There are different phases of technology commercialization as idea generation, technology development, seeking market opportunities, market promotion, and sustaining commercialization. These involve planning, basic and applied research, design, engineering and manufacturing, market strategy, decision making and motives and business planning, pre-launch and test marketing and value assessment.
3. Environmental-level factors referring the institutional framework, also referred to as innovation system, facilitating knowledge accumulation, cooperation with other firms, the sector of the enterprise and the availability of markets for technology including the industry structure. With various policy instruments, governments may enhance institutional framework by creation of national innovation systems, reforms in the national research system.

The DFID project research team employed World Bank data on manufacturing SMEs in Tanzania, in particular the Tanzania Enterprise Survey (ES) 2013 and an innovation follow-up survey conducted in 2014. The former provided a wide range of firm-level variables including information on recruitment, training and R&D practices within the firm. The innovation follow-up survey on the other hand provided evidence on the nature, role and determinants of innovation in Tanzania as well as data on commercialization and commercialization related variables.



Specifically, it contained information on the innovation output, innovation-related activities, commercialization and commercialization related activities such as sales of innovative products, product innovation, process innovation, organizational innovation, and marketing innovation for Tanzanian firms.

Research findings

The research team found that several *firm-level* factors influence a firm's chances of undertaking product innovation, particularly the availability of equipment, machinery or software and intangible technology. Innovation is limited by low levels of technological capability that constrain firms' capacities to undertake adequate internal research and development. A cost-reducing incentive in particular is an important factor impacting both product innovation and commercialization.

A key *innovation-level* factor concerns firm funding of and investing in external research and development. Innovation-level factors pertain to alignment of a firm's innovation activities to such factors as a firm's business model, nature of firm's product, communication costs, or absorptive capacity. Funding of external research and development is explicitly targeted towards enhancing innovation which in turn enhances a firm's capacity to absorb further knowledge. This innovation level factor enhances chances of firms undertaking product innovation. However, this firm funding does lower the commercialization of innovations. These investments may deviate attention from factors influencing commercialization such as developing and maintaining cooperation with domestic firms as well as shifting focus from cost reduction to development.

The research team found that within the *environmental-level* factors group, the sector a firm belongs to enhances chances of undertaking product innovation while cooperation with domestic firms and the cost reducing motive have the greatest impact on commercialization. Marketing factors surprisingly do not influence commercialization of innovations giving an indication that most firms do not pursue a market strategy simultaneously or that market strategies formulated by firms are yet to yield results.

' ... The sector a firm belongs to enhances chances of a firm undertaking product innovation while cooperation with domestic firms and the cost reducing motive for engaging in product innovation have the greatest impact on commercialization as they enhance commercialization of innovations by 19.5 percent and 18 percent respectively with the latter also enhancing chances of a firm undertaking product innovation. ' (Otieno et al. (2014)

Policy implications

The research shows that the availability of equipment is a critical factor in engaging in innovation activities in Tanzanian SMEs (but this does not apply for commercialization). A similar outcome with regard to equipment is observed in the complementary qualitative research part of the DFID project. The access to technology is perceived as an important limitation, which hampers SMEs to innovate. In fact, locally produced technology is hardly available and of insufficient quality, while imported technology too expensive.

Firm funding of external research and development is a key factor in product innovation. However, limited resources hinder many firms especially small and medium ones from doing so. This is sort of a market failure hence necessitating government intervention in order to reduce the cost of firms in investing in external R&D. This can be achieved through increased government support to vocational education and polytechnics to enhance the capacity of human resources who will undertake R&D as well as reducing credit constraints for firms in order to make it easier for them to finance external R&D. The research also shows that externally funding lowers commercialization. A policy implication is that funding external research should take explicit consideration and support for commercialization into account as well.

Cooperation with domestic firms has a significant impact on commercialization. Policies to support this process could be the promoting cooperation among domestic firms via events, platforms and business meetings. SME owners in the in-depth interviews confirmed the fact that they would like more cooperation, be it formal or

informal, with other manufacturing SMEs. However, in Tanzania, there are few little opportunities and occasions to do so



Moreover, many SMEs keep their doors closed to outsiders. One important reason is the unfriendly formal government institutions that make the business operation even more challenging unclear and inconsistently implemented regulatory framework.

The research show that marketing factors do not play a role commercialization of innovations in Tanzanian SMEs because most firms do not pursue a market strategy. One possible explanation is that the development of marketing strategies within Tanzanian firms is still in an early stage.

Policy interventions geared towards encouraging innovative firms to simultaneously develop marketing strategies are likely to enhance commercialization of innovations by enabling innovative firms to adapt to changing markets and technologies.

The research further shows taht product innovation and commercialization are promoted through the enhancement of firm efficiency and internal knowledge base. Policy instruments could thereby focus on improving firm efficiency and building internal knowledge base of firms. Awareness raising, business registration requirements and training could specifically focus on these internal capabilities.

With regard to the cost-reducing motive for engaging in product innovation, not all enterprise are aware about the cost-reducing motive, in particular in a factor-driven economy. Policy instruments such as awareness raising, education or training may include could overcome this limitation.

The research revealed a significant variance among the sectors' impact on the commercialization of innovation. Consequently, policy envisaging to promote commercialization should be sector-specific; 'one size fits all' will not work. The research further suggest various areas for research and policy development, in particular with regard to dynamics and trends over longer periods of time. One such area involves the behaviour of firms with regards to commercialization and the sustainability. Analysis of specific characteristics such as sectors, size of firms, and managerial characteristics in order to determine the impact of such factors on commercialization of innovations. The process and evolution of commercialization over time and its impact on subsequent commercialization is another area.

This policy brief is the product of a research project funded by the British Department for International Development (DFID) entitled 'Enabling Innovation and Productivity Growth in Low Income Countries' (EIP-LIC)'. The project is implemented by Tilburg University (The Netherlands) and explores SME-level innovation in Low Income Countries (LICs) and factors that contribute to or limit its diffusion. Data collection and research collaborations take place in 10 African and Asian countries (Bangladesh, Ethiopia, Ghana, India, Indonesia, Kenya, Tanzania, South Africa, Uganda and Vietnam). The policy implications of research are presented in a series of policy briefs, targeted at a broad audience of policy makers within governments, business and development agencies with a view to quantifying research outcomes and promoting evidence-based policy making.